[Report Lab03]- 2D object Coloring with OpenGL

*CS411 — Computer Graphics

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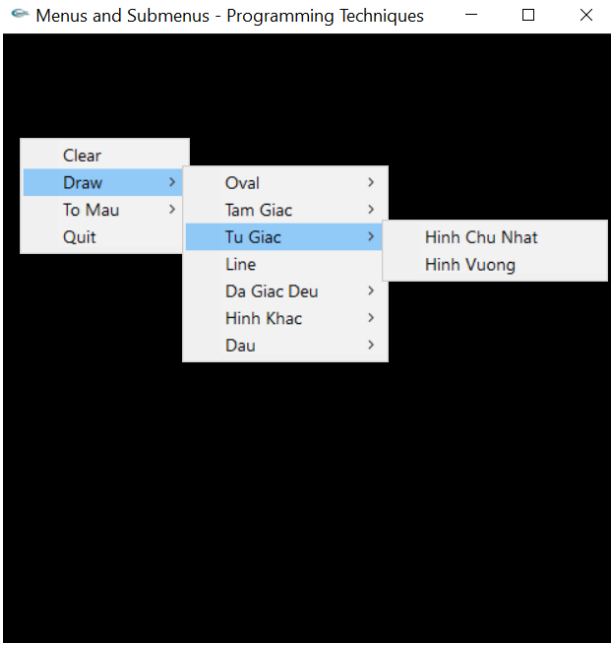
I. INTRODUCTION

In this lab, students are required implementing algorithms to color 2D objects using OpenGL Librabry.

Objects asked to be performed consist of lines, ovals, polygons, signs, rectangles. These shapes must be displayed on Glut window when the users draw them by mouse clicking. After displaying the shapes, the users can choose whether they are colored.

On top of that, students are also asked to constructs their code in OOP methodology.



II. REQUIREMENT

- Write an OpenGL program as follows:
  - Allow to draw one of any basic shape includes (circle, ellipse, rectangle, polygon) using context menu.
  - Allow to coloring this shape using seed point selected by clicking inside the polygon.
  - Right click on draw window will prompt context menu as below with all the mentioned functions.

III. INPUT AND EXPERIMENT

Users input completely by mouse clicking.

Any new drawing shape is saved into a vector of shape. As default, these shapes are drawn without filling. When Users color any shape, this shape will save the color and re-display this color whenever the list of shape is re-drawn.

The program uses boundary-Fill and Flood-Fill algorithms to color shapes.

Source code is structured in OOP methodology. In which, objects is classified in classes.

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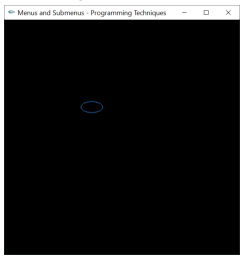
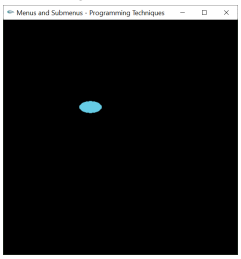
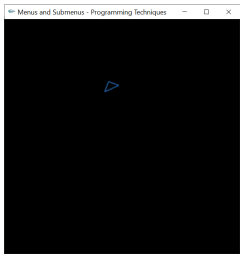
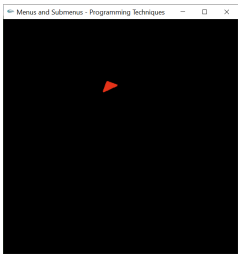
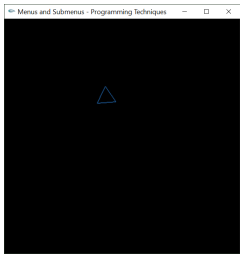
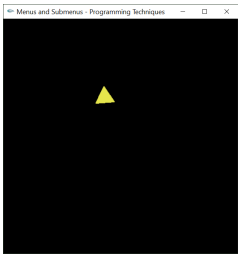
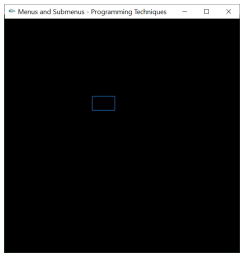
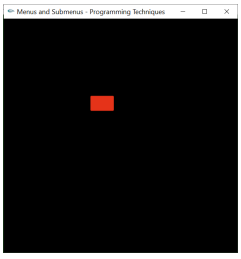
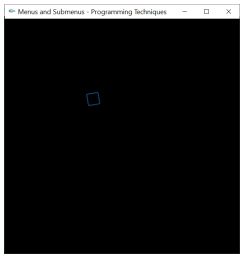
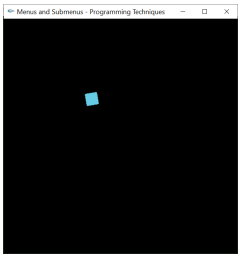
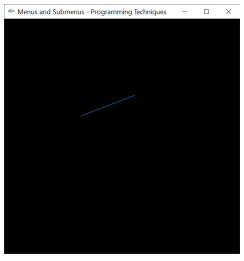
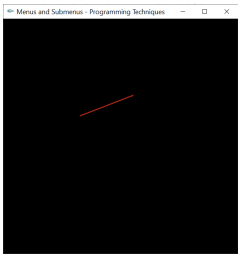
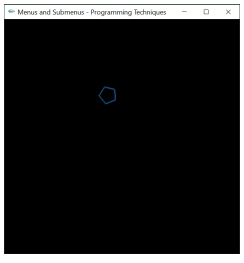
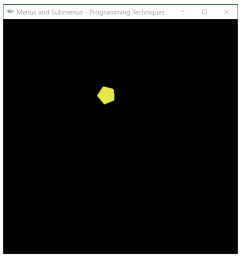
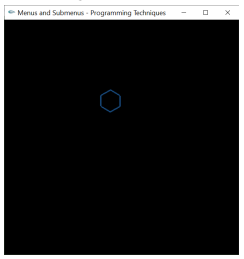
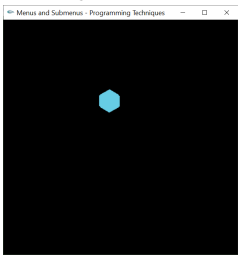
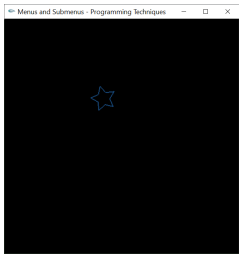
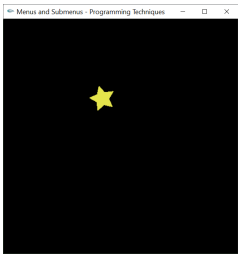
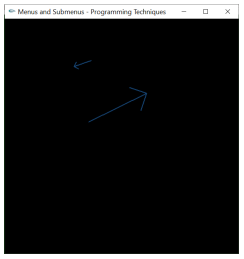
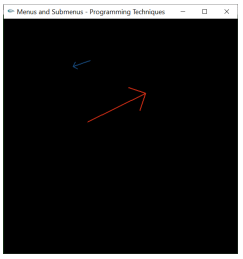
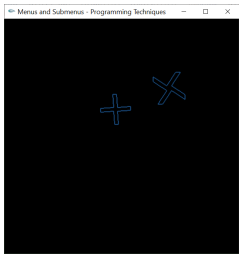
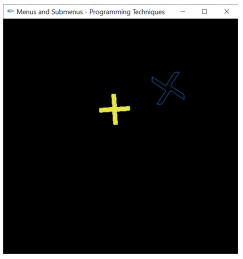
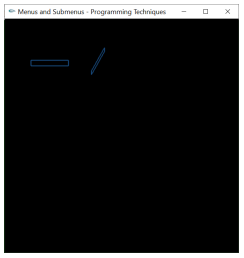
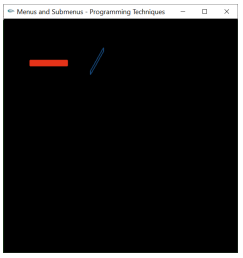
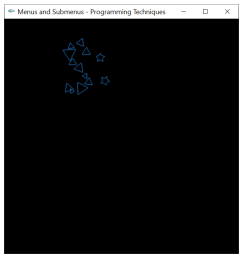
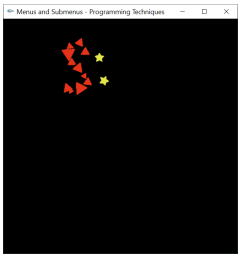
Ellipse		
Triangle		
Triangle		
Rectangle		
Square		
Line		
Slash		

	Drawing	Coloring
Polygon Polygon		
Star		
Arrow		
Cross		
Slash		
Combination		

IV. Conclusion

In order to color shapes, the program uses Boundary-Fill and Flood-Fill algorithms which are recursive functions. Therefore, this may lead to

stack overflow. The feasible solution for this problem is to draw and to color small shapes.

V. REFERENCE

- https://www.math-salamanders.com/list-of-geometric-shapes.html
- https://stackoverflow.com/questions/55514519/flood-fill-fails-to-fill-whole-shape-when-reaching-boundary-color
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- https://birunthag.blogspot.com/2014/05/openglc-boundary-fill-algorithm-using.html